

Application No. 09/856,431

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IN THE CLAIMS

Please amend the claims as follows:

1. (Currently amended) A secondary battery comprising:
a negative electrodes;
a positive electrode; and
an electrolyte, wherein: the negative electrode includes a negative electrode material capable of occluding and releasing light metal in an ionic state while the light metal precipitates in on the negative electrode in a state where an open circuit voltage is lower than an overcharge voltage.
2. (Currently amended) A secondary battery as claimed in claim 1, wherein ~~lithium (Li) is contained in the light metal.~~ the light metal comprises lithium.
3. (Currently amended) A secondary battery as claimed in claim 2, wherein lithium precipitates in on the negative electrode ~~in one part of a range where the open circuit voltage is from 0 V to 4.2 V, both inclusive.~~ when the open circuit voltage of the battery is at least 0 V and at most 4.2 V.
4. (Original) A secondary battery as claimed in claim 2, wherein a peak attributed to lithium ion and a peak attributed to lithium metal are obtained when measuring the negative electrode material in a full-charged state by a ^7Li polynuclear species nuclear magnetic resonance spectroscopy.
5. (Original) A secondary battery as claimed in claim 4, wherein the peak attributed to lithium ion measured in the full-charged state disappears when measuring the negative electrode material in a complete-discharged state by the ^7Li polynuclear species nuclear magnetic resonance spectroscopy.

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6. (Currently amended) A secondary battery as claimed in claim 1, wherein the light metal precipitates in on the negative electrode material.

7. (Currently amended) A secondary battery as claimed in claim 1, wherein ~~the maximum amount of the light metal precipitating in the negative electrode is from 0.05 to 3.0 times, both inclusive, the ability of charging capacity of the negative electrode material when the open circuit voltage is the maximum before reaching the overcharge voltage, wherein, when the open circuit voltage of the battery is below overcharging voltages, the ratio (moles of light metal precipitated on the negative electrode) / (moles of light metal reversibly occluded in the material of the negative electrode) is at least 0.05/1 and at most 3/1.~~

8. (Original) A secondary battery as claimed in claim 1, wherein the ability of charging capacity of the negative electrode material is 150 mAh/g and more.

9. (Currently amended) A secondary battery as claimed in claim 2-4, wherein the negative electrode has a negative electrode mixture layer containing the negative electrode material and the thickness of the negative electrode mixture layer is from at least 10 μm to at most 300 μm , both inclusive.

10. (Currently amended) A secondary battery as claimed in claim 1, wherein the negative electrode material contains 50 percent by volume weight and more of a negative electrode active material.

11. (Original) A secondary battery as claimed in claim 1, wherein the negative electrode contains a carbonaceous material as the negative electrode material.

12. (Original) A secondary battery as claimed in claim 1, wherein the positive electrode contains an oxide containing the light metal.

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13. (Original) A secondary battery as claimed in claim 1, wherein the positive electrode contains metallic carbonate.

14. (Original) A secondary battery as claimed in claim 13, wherein the metallic carbonate is lithium carbonate.

15. (Currently amended) A secondary battery as claimed in claim 1, wherein the electrolyte contains at least either one of the group consisting of ethylene carbonate ~~or~~ and propylene carbonate.

16. (Currently amended) A secondary battery as claimed in claim 15, wherein the electrolyte contains a non-aqueous solvent which contains propylene carbonate with a concentration of less than 30 percent by ~~volume~~ weight.

17. (Original) A secondary battery as claimed in claim 15, wherein the electrolyte contains ethylene carbonate and propylene carbonate and a mass fraction of mixing ethylene carbonate to propylene carbonate (ethylene carbonate/propylene carbonate) is 0.5 and more.

18. (Currently amended) A secondary battery as claimed in claim 1, wherein the electrolyte contains at least one ~~kind selected from~~ of the group consisting of chain ester carbonate, 2,4-difluoroanisole, and vinylene carbonate.

19. (Currently amended) A secondary battery as claimed in claim 18, wherein the electrolyte contains a non-aqueous solvent which contains 2,4-difluoroanisole with at a concentration of 15 percent by ~~volume~~ weight and below.

20. (Currently amended) A secondary battery as claimed in claim 18, wherein the electrolyte contains a non-aqueous solvent which contains vinylene carbonate with a concentration of 15 percent by ~~volume~~ weight and below.

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21. (Original) A secondary battery as claimed in claim 1, wherein the electrolyte contains ethylene carbonate, propylene carbonate, dimethyl carbonate, and ethyl-methyl carbonate.

22. (Original) A secondary battery as claimed in claim 1, wherein the electrolyte contains LiPF_6 .

23. (Original) A secondary battery as claimed in claim 1, wherein the electrolyte is in a solid state.

24. (Currently amended) A secondary battery comprising a negative electrode, a positive electrode and an electrolyte, wherein:

a the capacity of the negative electrode is expressed by the sum of a capacity which is obtained when occluding and releasing light metal in an ionic state and a capacity which is obtained when precipitating and dissolving light metal. the capacity due to the reversible occlusion of light metal ions and the capacity due to the reversible precipitation of light metal.

25. (Currently amended) A secondary battery as claimed in claim 24, wherein the negative electrode contains a negative electrode material ~~capable of occluding and releasing light metal in an ionic state~~ that reversibly occludes light metal ions.

26. (Original) A secondary battery as claimed in claim 25, wherein lithium (Li) is contained in the light metal.

27. (Original) A secondary battery as claimed in claim 26, wherein a peak attributed to lithium ion and a peak attributed to lithium metal are obtained when measuring the negative electrode material in a full-charged state by a ^7Li polynuclear species nuclear magnetic resonance spectroscopy.

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28. (Original) A secondary battery as claimed in claim 27, wherein the peak attributed to lithium ion measured in the full-charged state disappears when measuring the negative electrode material in a complete-discharged state by the ^7Li polynuclear species nuclear magnetic resonance spectroscopy.

29. (New) A secondary battery comprising:

a negative electrode;

a positive electrode; and

an electrolyte, wherein the negative electrode comprises a material that reversibly occludes light metal ions, the charge capacity of the negative electrode due to the reversible occlusion of light metal ions is smaller than the charge capacity of the positive electrode, and light metal precipitates on the negative electrode when the open circuit voltage of the battery is less than the voltage of the battery in a state of overcharge.

30. (New) A secondary battery as claimed in claim 29, wherein the light metal comprises lithium.

31. (New) A secondary battery as claimed in claim 30, wherein lithium precipitates on the negative electrode when the open circuit voltage of the battery is at least 0 V and at most 4.2 V.

32. (New) A secondary battery as claimed in claim 30, wherein a peak attributed to lithium ion and a peak attributed to lithium metal are obtained when measuring the negative electrode material in a full-charged state by a ^7Li polynuclear species nuclear magnetic resonance spectroscopy.

33. (New) A secondary battery as claimed in claim 32, wherein the peak attributed to lithium ion measured in the full-charged state disappears when

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measuring the negative electrode material in a complete-discharged state by the ^7Li polynuclear species nuclear magnetic resonance spectroscopy.

34. (New) A secondary battery as claimed in claim 29, wherein the light metal precipitates on the negative electrode material.

35. (New) A secondary battery as claimed in claim 1, wherein, when the open circuit voltage of the battery is below overcharging voltages, the ratio (moles of light metal precipitated on the negative electrode) / (moles of light metal reversibly occluded in the material of the negative electrode) is at least 0.05 / 1 and at most 3 / 1.

36. (New) A secondary battery as claimed in claim 35, wherein the ability of charging capacity of the negative electrode material is 150 mAh/g and more.

37. (New) A secondary battery as claimed in claim 29, wherein the negative electrode has a negative electrode mixture layer containing the negative electrode material and the thickness of the negative electrode mixture layer is from at least 10 μm to at most 300 μm .

38. (New) A secondary battery as claimed in claim 29, wherein the negative electrode material contains 50 percent by weight and more of a negative electrode active material.

39. (New) A secondary battery as claimed in claim 29, wherein the negative electrode contains a carbonaceous material as the negative electrode material.

40. (New) In a secondary battery comprising a negative electrode, a positive electrode and an electrolyte, wherein the negative electrode comprises a material that reversibly occludes light metal ions, the improvement comprising the negative electrode

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having a charge capacity due to the reversible occlusion of metal ions that is smaller than the charge capacity of the positive electrode.

41. (New) An electric or electronic device comprising the secondary battery of claim 40.

42. (New) In a secondary battery comprising a negative electrode, a positive electrode and an electrolyte, wherein the negative electrode comprises a material that reversibly occludes light metal ions, the improvement light metal precipitating on the negative electrode when the open circuit voltage of the battery is less than the voltage of the battery in a state of overcharge.

43. (New) An electric or electronic device comprising the secondary battery of claim 42.